

INTEGRATED CIRCUIT DEVICES HAVING DIELECTRIC REGIONS  
PROTECTED WITH MULTI-LAYER INSULATION STRUCTURES AND  
METHODS OF FABRICATING SAME

Abstract of the Disclosure

5 A dielectric region, such as a ferroelectric dielectric region of an integrated circuit capacitor, is protected by a multi-layer insulation structure including a first relatively thin insulation layer, e.g., an aluminum oxide or other metal oxide layer, and a second, thicker insulating layer, e.g., a second aluminum oxide or other metal oxide layer. Before formation of the second insulation layer, the first insulation layer and the dielectric preferably annealed, which can increase a remnant polarization of the dielectric region. The first insulation layer can serve as a hydrogen diffusion barrier during formation of the second insulation layer and other overlying structures. In this manner, degradation of the dielectric can be reduced. Devices and fabrication  
10 methods are discussed.